

REMARKS

Summary of the Office Action

Claims 1-5 are pending in the application. Claims 4 and 5 are rejected under 35 U.S.C. § 112, second paragraph. Claim 1 is rejected under 35 U.S.C. § 102(b) as being anticipated by Rousseau (FR '216) or Graf (DE '435). Claims 2 and 3 are rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Rousseau or Graf. Claims 4 and 5 are rejected under 35 U.S.C. § 103 as being unpatentable over Rousseau or Graf in view of Hirai (JP '903). The cancellation of claims 1-3 render the rejections of claims 1-3 moot. The rejections of claims 4 and 5 are respectfully traversed.

Claim Rejections Under 35 § 112

In rejecting claim 4, and its dependent claim 5, under § 112, second paragraph, the Examiner states that in claim 14, line 13, “a capacitor compensator formed of a closed loop stripline” is misleading since the Applicant’s invention is based on a capacitor being a lumped element. The Examiner further states that it is unclear as to how a closed loop stripline functions as a capacitor compensator. Applicant submits that amended claim 4 is definite within the meaning of 35 U.S.C. § 112, second paragraph.

Claim Rejections Under §§ 102 & 103

Summary of the Invention

The present invention relates to a radio filter of combline structure with a capacitor compensation circuit. In an exemplary embodiment shown in Figure 1, the filter includes two micro striplines 108a and 108b, respectively having an input terminal 106a and an output terminal 106b. Micro striplines 108a and 108b are respectively coupled through the via-holes

102a and 102b to capacitor compensators 110a and 110b which are grounded, and are also grounded through the via-holes 104a and 104b to the bottom ground layer 120. The capacitor compensators 110a and 110b should have a capacitance value such that the length of the micro stripline 108a, 108b electrically meets the path wavelength of the center frequency of the radio filter. Thus, capacitor compensators 110a and 110b reduce the length of the micro striplines 108a and 108b, so that impedance matching and tuning can be easily adjusted.

Analysis of the Claim Rejections

In rejecting claims 4 and 5, the Examiner cites Figures 1 and 5 of Rousseau and Figure 2, element M' of Graf, as showing a capacitor compensator formed of a closed loop stripline containing a via-hole connected with one of the via-holes of the stripline of the stripline filter. The Examiner admits that neither Rousseau or Graf shows the top ground layer having second input and output terminals formed of closed loop striplines containing via-holes connected respectively with the via-holes of the first input and output terminals. The Examiner cites Hirai, however, as disclosing a tri-plate stripline filter having input and output terminals formed of a closed loop stripline 28 connected to the stripline filter by via-holes.

However, with respect to the rejection of claims 4 and 5, applicant respectfully submits that the applied references, taken either together or in combination, do not teach or suggest a capacitor compensator connected to a closed loop stripline connected to a via-hole connected with one of the via-holes of the striplines of the stripline filter, as recited in claim 4. At least for this reason, Applicant believes that claims 4 and 5 are patentable over the applied references.

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In more detail, Rousseau (FR 2714216) relates to a high frequency resonator using a three plate or stripline structure with a tuned filter.

Further, Rousseau '216 discloses that the capacitors are connected to one side of the electrode of a line resonator element by a microstrip line. On the contrary, according to the present invention, the capacitor compensator is connected through a closed loop stripline and a via-hole. Thus, the invention claimed in claims 4-5 of the present application is different from that of Rousseau '216.

Graf (DE 4135435) relates to a comb line filter comprising the screened stripline. The second stripline of Graf may be viewed as corresponding to the closed loop stripline of the present invention. As stated above, in Graf '435, the comb filter comprises a screened stripline. However, the stripline of a radio filter disclosed in claim 4 (and the exemplary embodiment of Fig. 3) of the present invention does not consist of the closed loop stripline, unlike Graf '435.

Further, the capacitor of Graf '435 consists of an unscreened stripline, but the capacitor compensator disclosed in claim 4 and Fig. 3 of the present invention does not consist of an closed loop stripline. Thus, the invention claimed in claims 4-5 of the present invention is different from that of Graf '435.

Hirai (JP 62140501) relates to an adaptive type dielectric filter. The Examiner indicates that Hirai '501 discloses a triplate stripline filter having input and output terminals formed of a closed loop stripline 28 connected to the stripline filter by a via-holes. However, after reviewing Hirai '501, Applicant cannot find disclosure that the input and output terminals are formed of a closed loop stripline in Hirai '501.

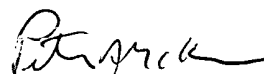
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Further, Hirai '501 discloses that a coupling capacity is built between the input and output terminals of the filter and the resonance electrode. On the contrary, the capacity compensatory of the present invention is included in the top ground layer, not a stripline filter. Thus, the invention claimed in claims 4-5 of the present invention is different from that of Hirai '501.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Page 7, the paragraph bridging pages 6 and 7:

Referring to Fig. 2, a pair of additional micro striplines 208b and 208c are arranged between a pair of micro striplines 208a and 208d which are respectively connected with the input and output terminals 206a and 206b, as shown in Fig. [1] 2. Of course, the number of the micro striplines arranged between the outer micro striplines 208a and 208d may be increased.

Page 9, first full paragraph:

The capacitor compensators 350a and 350b consist of capacitors of lumped element as described in the previous embodiment with capacitances proper for the frequency band filtered. Namely, the capacitor compensator 350a, 350b should have such a capacitance that the length of the micro stripline 308a, 308b electrically meets the half wavelength of the center frequency of the radio filter. The purpose of the capacitor compensators 350a and 350b is to reduce the length of the micro striplines 308a and 308b, and to easily adjust the impedance matching and tuning. To this end, using a capacitor of lumped element, the capacitance is easily adjusted without adjusting the width or distance as in the conventional filter arrangement. Although the capacitor compensators 350a and 350b are shown in Fig. [1] 3 respectively arranged at the ends of the micro striplines 308a and 308b on the same side, their positions may be varied.

Page 10, first full paragraph:

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The radio filter thus obtained filters the input signals from the input stripline 342a through the via-holes 344a and 310a to the input terminal 306a to select the signals of a given frequency band only which is delivered to the output terminal 306b, which then transfers the signals through the via-hole 310b to the via-hole 344b of the top ground layer 340. In this case, the given frequency band is determined by the lengths of and the space between the striplines 308a and 308b, and the capacitance values of the capacitor compensators [110a] 348a and [110b] 348b connected through the via-holes 302a, 348a and 302b, 348b to them. Further, the striplines 342a and 342b provided in the top ground layer 340 may be used to connect other devices to the radio filter. For example, the stripline 342a may be used to connect an antenna, and the stripline 342b may be used to connect with another signal processing device.

IN THE CLAIMS:

Claims 1-3 are cancelled.

The claims are amended as follows:

4. (Amended) A radio-filter of combline structure with a capacitor compensation circuit, comprising:

a plurality of input terminals;

a plurality of output terminals;

a stripline filter having at least one pair of striplines arranged between first input and output terminals for filtering input signals through said first input terminal to select signals of a given frequency band for delivery to said first output terminal, each of said striplines having a via-hole at each of its respective ends, said first input and output terminals having via-holes;

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a top ground layer having second input and output terminals formed of closed loop striplines containing via-holes connected respectively with the via-holes of said first input and output terminals of said stripline filter, and

a capacitor compensator [formed of] connected to a closed loop stripline [containing] connected to a via-hole connected with one of the via-holes of the striplines of said stripline filter to connect said capacitor compensator with one of the striplines of said stripline filter; and

a bottom ground layer connected to other via-holes of the stripline of said stripline filter which are not connected with said capacitor compensator, wherein said other via-holes ground said stripline.